

UNIVERSITY OF BOLTON

CREATIVE TECHNOLOGIES

BSC COMPUTER NETWORKS & SECURITY

SEMESTER TWO EXAMINATION 2018/2019

NETWORK MANAGEMENT

MODULE NO: CPU6009

Date: Thursday 23rd May 2019

Time: 14:00 – 16:00

INSTRUCTIONS TO CANDIDATES:

There are **FIVE** questions.

Answer **FOUR** questions.

All questions carry equal marks.

Individual marks are shown within the question.

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BSc Computer Networks & Security
Semester One Examination 2018-2019
Network Management
No. CPU6009

QUESTION 1

- a) What is SNMP, MIB, Inform, trap and set request? Evaluate the Components and states ports are used in Snmp? Support your answer with examples. **(10 marks)**
- b) Explain the process of fragmentation used in IPv4 networks. Use as an example a 7352 Byte (FDDI) packet traversing a router link with MTU=528. Indicate how things would differ in an IPv6 environment. **(10 marks)**
- c) How would you accommodate non-SNMP and different versions of SNMP in a managed communications network? **(5 marks)**

QUESTION 2

- a) Calculate the propagation time and the transmission time for a 25 MB file, if the maximum data rate (bandwidth) of the network is 15 Mbps? Assume the distance between the sender and the receiver is 20,000 km. The light travels at 2.4×10^8 m/sec? if the latency = 1—msec calculate the BDP? **(15 marks)**
- b) Using SNMP commands explain in detail how you would retrieve statistics from a managed device such as a Router or Ethernet Switch. If you wanted to traverse a group of OID's what command would you use?
If you wanted to analyse utilisation of an Ethernet Switch port, how would you do it? If you wanted to analyse packet size distribution, how would you achieve it? **(10 marks)**

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QUESTION 3

- a) With respect to Flow Management used in data networks, explain what a Flow is. Include a brief review of the different standards currently being used. Define the unique keys used in this technology. Describe how this technology can assist network managers to identify and mitigate attacks encountered in the network. **(15 marks)**
- b) Evaluate the Netflow mechanism? Discuss the Netflow export versions 1, 5, 7, 8, 9 and highlight the Netflow possible use. **(10 marks)**

QUESTION 4

- a) What is meant by 1 Erlang of traffic and hence define what an Erlang is. You must include in your discussion the term CCS Centrum Call Second. **(5 marks)**
- b) Using Erlang to Packet conversion, what is the equivalent throughput in bytes of 12 Erlangs, based on 6256kbps channels? **(5 marks)**
- c) Using the table on page 4, which is an extract from an Erlang B table, calculate the following:

Situation 1: If 2 Erlangs of VoIP traffic are required and the grade of service needed to overcome interference is to be P.003, how many trunks are required for this transmission?

Situation 2: Given 3 trunks and a probability of blocking GOS = 0.05, how many Erlangs of traffic can be carried by this network?

Situation 3: Given 6 Erlangs of traffic that utilise 7 trunks, what is the probability of blocking? **(15 marks)**

Question 4 continues over the page...

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Question 4 continued....

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TABLE B-1

Erlang B Traffic Tables

Trunks	$P = 0.001$		$P = 0.01$		$P = 0.02$		$P = 0.03$		$P = 0.05$		$P = 0.10$	
	CCS	Erlangs	CCS	Erlangs	CCS	Erlangs	CCS	Erlangs	CCS	Erlangs	CCS	Erlangs
1	0	0.001	0.4	0.01	0.7	0.02	1.1	0.03	1.8	0.05	4.0	0.11
2	1.8	0.05	5.4	0.15	7.9	0.22	10.1	0.28	13.7	0.38	21.6	0.60
3	6.8	0.19	16.6	0.46	21.6	0.60	26.9	0.72	32.4	0.90	45.7	1.27
4	15.8	0.44	31.3	0.87	39.2	1.09	45.4	1.26	54.7	1.52	73.8	2.05
5	27.4	0.76	49.0	1.36	59.8	1.66	67.7	1.88	79.9	2.22	104.0	2.88
6	41.4	1.15	68.8	1.91	82.1	2.28	91.4	2.54	107.0	2.96	135.0	3.76
7	56.9	1.58	90.0	2.50	106	2.94	117.0	3.25	135.0	3.74	168.0	4.67
8	73.8	2.05	113	3.13	131	3.63	144	3.99	163	4.54	202	5.60
9	92.2	2.56	136	3.78	156	4.34	171	4.75	193	5.37	236	6.55
10	111	3.09	161	4.46	183	5.08	199	5.53	224	6.22	270	7.51
11	131	3.65	186	5.16	210	5.84	228	6.33	255	7.08	306	8.49
12	152	4.23	212	5.88	238	6.62	257	7.14	286	7.95	341	9.47
13	174	4.83	238	6.61	267	7.41	287	7.97	318	8.83	377	10.47
14	196	5.45	265	7.35	295	8.20	317	8.80	350	9.73	413	11.47
15	219	6.08	292	8.11	324	9.01	347	9.65	383	10.63	449	12.48
16	242	6.72	319	8.87	354	9.83	378	10.51	415	11.54	486	13.50
17	266	7.38	347	9.65	384	10.66	409	11.37	449	12.46	523	14.52
18	290	8.05	376	10.44	414	11.49	441	12.24	482	13.38	560	15.55
19	314	8.72	404	11.23	444	12.33	472	13.11	515	14.31	597	16.58
20	339	9.41	433	12.03	474	13.18	504	14.00	549	15.25	634	17.61
21	364	10.11	462	12.84	505	14.04	536	14.89	583	16.19	671	18.65
22	389	10.81	491	13.65	536	14.90	568	15.78	617	17.13	709	19.69
23	415	11.52	521	14.47	567	15.76	600	16.68	651	18.08	748	20.74
24	441	12.24	550	15.29	599	16.63	633	17.58	685	19.03	784	21.78
25	467	12.97	580	16.12	630	17.50	665	18.48	720	19.99	822	22.83

QUESTION 5

- a) With the assistance of a diagram evaluate what is meant by 'Hot Potato' and 'Cold Potato' routing between an ISP and customers. Include any mechanisms that will potentially be able to direct traffic to a preferred destination. **(10 marks)**
- b) Outline what is meant by the term 'PMTU Black Hole Router' and hence describe the impact on managing such network connections. **(10 marks)**
- c) Explain what issues and challenges a network manager has to address to implement a multi-vendor management system. **(5 marks)**

END OF QUESTIONS